

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/FI2005/000134

International filing date (day/month/year)
04.03.2005

Priority date (day/month/year)
04.03.2004

International Patent Classification (IPC) or both national classification and IPC
G01F1/00, G01F1/80, G01F1/88

Applicant
ABB OY

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/FI2005/000134

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/FI2005/000134

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	2,3,5-7,9,10,12,13,15-17,19-23
	No: Claims	1,4,8,11,14,18
Inventive step (IS)	Yes: Claims	
	No: Claims	1-23
Industrial applicability (IA)	Yes: Claims	1-23
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/FI2005/000134

Re Item V.

1 Reference is made to the following documents:

- D1: US 4 108 574 A (BARTLEY ET AL) 22 August 1978 (1978-08-22)
D2: GB 2 313 197 A (ADVANCED ENERGY MONITORING SYSTEMS LIMITED)
19 November 1997 (1997-11-19)
D3: WO 03/031918 A (ABB AB) 17 April 2003 (2003-04-17)

2 INDEPENDENT CLAIM 1

- 2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT. Document D1 discloses (the references in parentheses applying to this document) a method for measuring a flow in a pump system, in which a liquid flow is generated by means of a pump (abstract) and the pump is actuated by an electric drive (figure 1), in which the rotation speed of an alternating-current motor is controlled with a control unit (column 6, lines 53-54), said method comprising the steps of:
- measuring the pump power in the pump system (column 5, line 52),
 - measuring the liquid pressure (column 8, line 56),
 - measuring the speed rotation of the pump (column 9, lines 66-67),
 - determining a first estimate of the liquid flow on the basis of the measured pump power and rotation speed variables (column 5, lines 39-42 and lines 50-52),
 - determining a second estimate of the liquid flow on the basis of the measured liquid pressure and rotation speed variables (column 9, line 65-column 10, line 1) and
 - implicitly determining the flow measurement result by logical selection on said first and second estimate.
- 2.2 When considering document D2, the present application would appear not to meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 would not

~~involve an inventive step~~ in the sense of Article 33(3) PCT.

The only difference of claim 1 to document D2, if regarded as being the closest prior art, is that the rotation speed of the pump is measured and used to determine the two estimates. The rotation speed is implicitly considered to be constant in document D2. Said speed being an important parameter of the flow condition in a pump, it would be obvious to the man skilled in the art to consider it for determining a flow in the pump by using for example characteristics generally submitted by the manufacturers (see document D3, page 11, lines 19-21) or by using the well-known affinity laws (see document D1, column 9, lines 15-16).

- 2.3 A similar consideration as in 2.2 above would apply when considering document D3 as the closest prior art, the subject-matter of claim 1 thus not involving an inventive step (Article 33(3) PCT).

3 INDEPENDENT CLAIM 11

- 3.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 11 is not new in the sense of Article 33(2) PCT.

Document D1 discloses an arrangement for measuring the flow in a pump system comprising means for working out the steps of the method described in 2.1 above (see references to D1 in 2.1).

- 3.2 The same reasonings as in 2.2 and 2.3 would apply if respectively documents D2 and D3 would be considered as the closest prior art.

4 DEPENDENT CLAIMS 2-10, 12-23

Dependent claims 2-10, 12-23 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT), see documents D1, D2 and D3 and the corresponding passages cited in the search report.

Re Item VIII.

5 The application does not meet the requirements of Article 6 PCT, because claims 1,3,11,12,13,14,18,19 are not clear.

5.1a Measuring the liquid pressure is not enough to enable the correct implementation of the method disclosed in claim 1. It is essential to measure a pressure difference between the output and the input of the pump (description, page 7, lines 25-30). Said essential features are missing in claim 1 (Article 6 PCT taken in combination with Rule 6.3(b) PCT).

5.1b The terms "static pressure" and "liquid pressure" as used in claim 1 and in the description seem not to be correct, thus leading to an unclear definition of the subject-matter in claim 1.

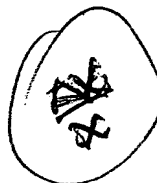
5.1c The same applies to claim 11.

lifting height.

5.2 Some of the features in the apparatus claims 12,13,14,18,19 relate to a method of using the apparatus rather than clearly defining the apparatus in terms of its technical features. The intended limitations are therefore not clear from these claims, contrary to the requirements of Article 6 PCT.

5.3a It is not clear from claim 3 which entities are compared to define the two flow value ranges. The expression "to the same relative change" is unclear. The same applies to claim 13.

5.3b Furthermore, the features of claims 3 and 13 are not to be found explicitly in the description. Claims 3 and 13 are therefore not supported by the description as required by Article 6 PCT.



$\frac{\Delta x}{x_0}$
 $\frac{\Delta y}{y_0}$